IN THE CLAIMS:

1. A method for displaying an image on a light-emitting diode (LED) display, the display comprising a matrix of pixels, each pixel made up of at least four LEDs each capable of emitting light at an individual chromaticity, the method comprising:

specifying a color to be displayed at a pixel;

selecting at least one desired operating characteristic for said pixel;

selecting a color gamut containing said specified color and having at least one operating parameter corresponding to said at least one desired operating characteristic, said color gamut being selected from a plurality of possible color gamuts, each color gamut in said plurality being defined by a different set of said at least three LEDs of said pixel and being associated with at least one operating parameter; and

generating said specified color with said selected color gamut.

2. The method according to claim 1, wherein one of said plurality of color gamuts is defined by at least four LEDs.

3. The method according to claim 1, wherein said selecting comprises:

selecting a specific LED within a pixel for which an operating parameter is to be optimized; and

selecting the color gamut most closely associated with said optimized operating parameter.

4. The method according to claim 1, wherein said at least one desired operating characteristic includes at least one of predetermined power consumption, predetermined current draw, predetermined time usage and predetermined brilliance.

5. The method according to claim 4, wherein said at least one operating parameter includes at least one of power consumption, current draw, on/off state and brilliance.

6. The method according to claim 4, wherein the predetermined power consumption corresponds to a minimized power consumption.

7. The method according to claim 4, wherein the predetermined current draw corresponds to a minimized current draw.

8. The method according to claim 4, wherein the predetermined usage time corresponds to a minimized usage time.

9. The method according to claim 3, wherein at least one of said plurality of color gamuts is defined by three LEDs.

10. The method according to claim 9, wherein the selected color gamut is defined by three LEDs.

11. The method according to claim 10, wherein the operating parameter has a value of about zero.

12. The method according to claim 1, wherein generating said specified color includes driving a selected set of said at least three LEDs with a non-linear control circuit.

13. The method of claim 12, wherein the non-linear control circuit has a characteristic function approximating human just-noticeable differences in luminance.

14. The method of claim 12, wherein the non-linear control circuit has a polynomial characteristic function approximating human just-noticeable differences in luminance.

15. The method of claim 12, wherein the non-linear control circuit has a exponential characteristic function approximating human just-noticeable differences in luminance.

16. The method of claim 12, wherein the non-linear control circuit has a piece-wise linear characteristic function approximating human just-noticeable differences in luminance.

17. The method of claim 1, wherein generating said specified color includes dividing a range of luminance into a set of increments.

18. The method of claim 17, wherein the set of increments are spaced to approximate human just-noticeable differences in luminance.

19. The method of claim 17, wherein the set of increments are spaced according to a polynomial function approximating human just-noticeable differences in luminance.

20. The method of claim 17, wherein the set of increments are spaced according to an exponential function approximating human just-noticeable differences in luminance.

21. The method of claim 17, wherein the set of increments are spaced according to a piece-wise linear function approximating human just-noticeable differences in luminance.

22. The method of claim 1, further comprising;

detecting an output of the LED display; and

adjusting a range of luminance for the output of the LED display.

23. The method of claim 1, wherein specifying a color is performed by a computer.

24. The method of claim 1, wherein the computer is remotely located from the LED display.

25. The method of claim 1, wherein the computer communicates with the LED display over a communications network.

1.

26. A method for displaying an image on a light-emitting diode display, the display having a first set of light-emitting diodes capable of emitting light having a first set of at least four chromaticities, method comprising:

identifying at least a first light-emitting diode from said first set capable

of emitting light having at least one chromaticity for which an operating parameter is to be minimized;

identifying a first region of chromaticity with a first boundary available through operation of said at least one light-emitting diode and a first subset of said first set of light emitting diodes capable of emitting light having a first subset of chromaticities;

identifying a second region of chromaticity with a second boundary available through operation of a second subset of light emitting diodes capable of emitting light having a second subset of chromaticities;

specifying a desired color;

determining whether the desired color resides within the second boundary;

generating the desired color using the second set of light-emitting diodes if the desired color resides within the second boundary, thereby minimizing said operating parameter; and

generating the desired color using said at least one light-emitting diode and the second set of light-emitting diodes if the desired color does not reside within the second boundary.

2. ~~27~~. The method of claim 1 ~~26~~, wherein the operating parameter to be minimized is power.

3. ~~28~~. The method of claim 1 ~~26~~, wherein the operating parameter to be minimized is current.

4. ~~29~~. The method of claim 1 ~~26~~, wherein the operating parameter to be minimized is operating time.

5. ~~30~~. The method of claim 1 ~~26~~, further comprising the step of verifying that the desired color resides within the first boundary.

6. ~~31~~. The method of claim 1 ~~26~~, further comprising the step of verifying that the desired color resides within the first boundary or the second boundary.

32. A method for displaying an image on a light-emitting diode display, the method comprising:

calibrating a workstation display;

developing an image on said workstation display;

converting the image to a digitally specified image, wherein the digitally specified image is in accordance with a standard;

transferring the digitally specified image to a recipient; and

mapping the digitally specified image to an light-emitting diode display.

33. The method of claim 32, wherein the standard is a CIE standard.

34. The method of claim 33, wherein the standard is a CIELAB standard.

35. The method of claim 32, further comprising the step of calibrating the light-emitting diode display.

36. The method of claim 32, wherein a communications network is used for transferring the digital image.

37. The method of claim 36, wherein the communication network is a wide area network.

38. The method of claim 36, wherein the communications network is a TCP/IP network.

39. The method of claim 32, further comprising controlling the luminance of the light-emitting diode display.

40. A fault tolerant method for displaying images on an light-emitting diode display, the method comprising:

inputting a first image;

displaying the first image;

detecting the absence of a second image;

inputting a default image; and
displaying the default image.

41. The method of claim 40, wherein the default image is a set of default images.

42. A light-emitting diode (LED) display system, comprising:

a matrix of pixels, each pixel made up of at least four LEDs each capable of emitting light at an individual chromaticity, said LEDs being combinable in at least four separate sets, each set defining a color gamut associated with at least one operating parameter; and

at least one processor controlling said pixel matrix, said processor receiving information from a user specifying a color to be displayed at a pixel and at least one desired operating characteristic for said pixel, said at least one processor

selecting the color gamut containing said specified color wherein said at least one operating parameter corresponds most closely to said at least one desired operating characteristic,

generating a signal for creation of said specified color by said pixel with said selected color gamut.

43. The LED display system of claim 42, wherein the matrix of pixels is shaded using a plurality of louvers.

44. The LED display system of claim 42, wherein a plurality of pixels comprises a pixel block.

45. The LED display system of claim 44, wherein a plurality of pixel blocks is arranged in rows and columns to produce the matrix of pixels.

46. The LED display system of claim 42, wherein the at least one processor is in communication with a camera detecting an output of the LED display system.

47. The LED display system of claim 46, wherein the at least one processor specifies a range of luminance for the LED display system in response to the output of the LED display system.

48. The LED display system of claim 47, wherein the range of luminance is divided into increments with spacing corresponding to human just-noticeable differences in luminance.

49. The LED display system of claim 47, wherein the range of luminance is divided into increments with spacing corresponding to a polynomial function approximating human just-noticeable differences in luminance.

50. The LED display system of claim 47, wherein the range of luminance is divided into increments with spacing corresponding to an exponential function approximating human just-noticeable differences in luminance.

51. The LED display system of claim 47, wherein the range of luminance is divided into increments with spacing corresponding to a piece-wise linear function approximating human just-noticeable differences in luminance.

52. The LED display system of claim 42, wherein the at least one processor

inputs a first image;

directs a signal to the LED display system to display the first image;

detects the absence of a second image;

inputs a default image; and

directs a signal to the LED display system to display the default image.

53. The LED display system of claim 52, wherein the default image is a set of default images.

54. The LED display system of claim 42, wherein one of the at least one processor is remotely located from the matrix of pixels.

55. The LED display system of claim 52,wherein one of the at least one processor c~~ommunicates over a~~ digital network.

7.

~~56.~~ A light-emitting diode display comprising:

a plurality of pixels arranged in a plurality of rows and columns to

display a predetermined image, the plurality of pixels composed of a first set of light-emitting diodes capable of emitting light having a first set of at least four chromaticities;

digital input circuitry to input a digital signal for a desired color and a desired luminance;

a digital-to-analog converter capable of converting the digital signal to an analog signal, the digital-to-analog converter having a dynamic range;

control electronics capable of driving the plurality of pixels; and

a threshold operator capable of determining whether the desired color is within a first region of chromaticity with a first boundary available through operation of at least one light-emitting diode capable of emitting light having a first chromaticity and a first subset of said first set of light emitting diodes capable of emitting light having a first subset of chromaticities, wherein the first subset of light emitting diodes is less than or equal in number to the first set,

the threshold operator further capable of determining whether the desired color is within a second region of chromaticity with a second boundary available through operation of second subset of the first set of light emitting diodes having a second subset of chromaticities, the second subset not including the first light-emitting diode and, wherein the second subset of light-emitting diodes is less than or equal to the first set.

8. ~~57~~. The light-emitting diode display of claim 7 ~~56~~, wherein the desired color is within the first region of chromacity and the control electronics drives the at least one light-emitting diode and the second set of light-emitting diodes to generate the desired color.

9. ~~58~~. The light-emitting diode display of claim 7 ~~56~~, wherein the desired color is within the second region of chromacity and the control electronics drives the third set of light-emitting diodes to generate the desired color.

10. ~~59~~. The light-emitting diode display of claim 7 ~~56~~, wherein the control electronics implements a non-linear control function.

11. ~~60~~. The light-emitting diode display of claim 9 ~~58~~, wherein the control electronics

implements a polynomial function.

12. ~~61.~~ The light-emitting diode display of claim 9 ~~58,~~ wherein the control electronics implements a piece-wise linear function.

13. ~~62.~~ The light-emitting diode display of claim 9 ~~58,~~ wherein the control electronics implements a control function closely matching human perceptible just-noticeable difference in intensity.

14. ~~63.~~ The light-emitting diode display of claim 7 ~~56,~~ wherein the parameter is power.

15. ~~64.~~ The light-emitting diode display of claim 7 ~~56,~~ wherein the parameter is current.

16. ~~65.~~ The light-emitting diode display of claim 7 ~~56,~~ wherein the parameter is operating time.

17. ~~66.~~ A light-emitting diode display system comprising:

a first set of light-emitting diodes capable of emitting light having a first set of chromacities, the first set of chromacities being equal to or greater than four;

a first memory device for storing digital information;

a first computer processor capable of executing the steps of

identifying at least one light-emitting diode capable of emitting light having a at least one chromacity from within the first set of diodes for which a parameter is to be minimized;

identifying a first region of chromacity with a first boundary available through operation of the at least one light-emitting diode and a second set of light emitting diodes capable of emitting light having a second set of chromacities, wherein the second set of light emitting diodes is less than or equal to the first set;

identifying a second region of chromacity with a second boundary available through operation of a third set of light emitting diodes capable of emitting light having a third set of chromacities, the third set not including the first light-emitting diode and, wherein the third set of light-emitting diodes is less than or equal to the first set;

specifying a desired color;

determining whether the desired color resides within the second boundary;

if the desired color resides within the second boundary, generating the desired color using the third set of light-emitting diodes; and

if the desired color does not reside within the second boundary, generating the desired color using the at least one light-emitting diode and the second set of light-emitting diodes.

18. ~~67~~. The system of claim ~~66~~ 17, wherein the parameter to be minimized is power.

19. ~~68~~. The system of claim ~~66~~ 17, wherein the parameter to be minimized is current.

20. ~~69~~. The system of claim ~~66~~ 17, wherein the parameter to be minimized is operating time.

21. ~~70~~. The system of claim ~~66~~ 17, wherein the first computer processor is further capable of executing the step of verifying that the desired color resides within the first boundary.

22. ~~71~~. The system of claim ~~66~~ 17, wherein the first computer processor is further capable of executing the step of verifying that the desired color resides within the first boundary or the second boundary.

23. ~~72~~. The system of claim ~~66~~ 17, wherein a second computer processor is capable of sharing the executing the steps of

identifying at least one light-emitting diode capable of emitting light having a at least one chromacity from within the first set of diodes for which a parameter is to be minimized;

identifying a first region of chromacity with a first boundary available through operation of the at least one light-emitting diode and a second set of light emitting diodes capable of emitting light having a second set of chromacities, wherein the second set of light emitting diodes is less than or equal to the first set;

identifying a second region of chromacity with a second

boundary available through operation of a third set of light emitting diodes capable of emitting light having a third set of chromacities, the third set not including the first light-emitting diode and, wherein the third set of light-emitting diodes is less than or equal to the first set;

specifying a desired color;

determining whether the desired color resides within the second boundary;

if the desired color resides within the second boundary, generating the desired color using the third set of light-emitting diodes; and

if the desired color does not reside within the second boundary, generating the desired color using the at least one light-emitting diode and the second set of light-emitting diodes.